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THE INVENTORY OF ELECTROMAGNETICALLY ENRICHED ISOTOPES

October 31, 1953

C. P. Keim
C. E. Normand
Boyd Weaver

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The Inventory of

ELECTROMAGNETICALLY ENRICHED ISOTOPES

October 31, 1953

C. P. Keim
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Date Issued

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ISOTOPE RESEARCH AND PRODUCTION DIVISION
C. P. Keim, Director

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ABSTRACT

This inventory lists the isotopes which have been concentrated electromagnetically, along with their enriched abundances, the element weights, and product forms available in milligram quantities to users on Atomic Energy Commission projects and in university and industrial laboratories. Occasional isotope lots are listed which have been exhausted but their enriched isotopic abundance indicates what may be expected on inventory replenishment.

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Thallium	43
Tin	30-32
Titanium	15-16
Tungsten	39-40
Vanadium	16
Zinc	21
Zirconium	25-26

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THE INVENTORY

This report of electromagnetically enriched isotopes is revised frequently to include all isotopes which are available for use, or have been enriched and are in the process of chemical refinement. The isotopic abundance of each enriched sample and the amount of each isotope in the inventory are also listed. The list also includes some isotopes which have been concentrated but are not available at present.

All weights listed are elements weights converted from compound weights by standard gravimetric factors.

Isotopic abundance data not in this report, such as concentrations of other isotopes in the lot or chemical purity, will be submitted upon request. Spectrographic analyses and complete isotopic abundance data will be forwarded with all shipments or as soon as available.

REQUESTS FOR ALLOCATION

Isotopes produced by the electromagnetic process are available in milligram quantities for distribution on loan and may be requested by using Form AEC-100. Copies of this form may be obtained from the Isotopes Division, U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee.

The completed forms should be returned to the AEC Isotopes Division, Oak Ridge, Tennessee, who pass on all requests for allocation. If the requester wishes to mail the request forms and purchase order at one time to the Stable Isotope Research and Production Division they will forward the request forms to the AEC for approval.

PURCHASE ORDERS

All purchase orders are to be sent to Stable Isotope Research and Production Division, Attention: Dr. C. P. Keim, Oak Ridge National Laboratory, P. O. Box P, Oak Ridge, Tennessee. One copy of the approved Form AEC-100 must accompany the purchase order or have been forwarded to the supplier by the AEC Isotopes Division.

SHIPPING

Packaging and shipping of electromagnetically enriched isotopes by the supplier are done on Wednesday of each week in order that shipments may be processed most expeditiously.

LOAN PERIODS

Users of stable isotopes who need extensions of their loan periods should write the AEC Isotopes Division, Oak Ridge, Tennessee

RETURNED ISOTOPES

All electromagnetically enriched isotopes are to be returned to the supplier when the user has completed his need for them. All unused and uncontaminated portions of the original shipment will be replaced in the inventory. If it is possible and economical to do so the supplier will recover enriched isotopes from products returned by the user.

Returned shipments are to be sent to Stable Isotope Research and Production Division, Attention: Dr. C. P. Keim, Oak Ridge National Laboratory, P. O. Box P, Oak Ridge, Tennessee. An outline of the treatment the isotopes have received should accompany the shipment to aid in chemical recovery of the isotopes.

SPECIAL SERVICES

All isotopes will be shipped in the product form listed in this inventory unless special arrangements are made with the supplier for further chemical processing; an estimate of the cost for additional chemistry will be furnished by the supplier if requested.

If isotopic abundance analysis services are needed by users they should contact the Isotope Research and Production Division, Oak Ridge National Laboratory, regarding their specific needs; an estimate of the cost will be furnished if requested.

The user is invited to contact the Stable Isotope Research and Production Division, ORNL, regarding the latest inventory quantities of electromagnetically enriched stable isotopes and their isotopic and chemical analyses; the Division is also ready to assist in technical problems relative to stable isotope uses.

SUMMARY OF PRODUCTION AND SHIPMENTS

Atomic No.	Element	Production Completed	No. of Lots Now Available For Shipment	No. of Individual Shipments and Transfers Made
51	Antimony	4	4	29
56	Barium	19	15	32
4	Beryllium	2	0	2
5	Boron	5	7	6
35	Bromine	2	2	6
48	Cadmium	19	15	78
20	Calcium	39	18	61
6	Carbon	3	2	3
58	Cerium	14	12	35
17	Chlorine	7	6	9
24	Chromium	14	9	66
29	Copper	13	11	32
31	Gallium	2	2	18
64	Gadolinium	7	1	0
32	Germanium	11	10	37
72	Hafnium	6	0	41
49	Indium	12	9	26
77	Iridium	2	0	0
26	Iron	79	60	81
57	Lanthanum	2	2	6
82	Lead	29	25	63
3	Lithium	24	10	117
12	Magnesium	17	14	46
80	Mercury	40	33	95
42	Molybdenum	31	26	92
60	Neodymium	21	17	59
28	Nickel	26	14	68
8	Oxygen	2	0	0
46	Palladium	6	0	4
78	Platinum	8	8	3
19	Potassium	31	23	58
75	Rhenium	2	2	16
37	Rubidium	2	2	12
62	Samarium	21	13	72
34	Selenium	47	43	64
14	Silicon	9	10	25
47	Silver	8	8	18
38	Strontium	14	9	33
16	Sulfur	9	6	16
52	Tellurium	42	34	90
81	Thallium	16	12	29
50	Tin	63	55	130
22	Titanium	14	9	64
74	Tungsten	18	17	50
23	Vanadium	3	3	7
30	Zinc	16	10	63
40	Zirconium	27	22	71
	TOTAL	808	610	1,933

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Lithium					
Li 6	7.43	95.2	ED 537(a)	50	Li_2SO_4
Li 6	7.43	95.5	ED 537(b)	15	Li_2SO_4
Li 6	7.43	88.22	EZ 627(e)	12	Li_2SO_4
Li 6	7.43	94.07	FI 667(a)	25	Li_2SO_4
Li 6	7.43	91.6	FY 745(b)	25	Li_2SO_4
Li 6	7.43	97.028	FY 745(c)	175	Li_2SO_4
Li 6	7.43	99.78	GD 764(e)	250	Li_2SO_4
Li 7	92.57	99.91	I 26(a)	10	Li_2SO_4
Li 7	92.57	99.5	AR 140(a)	711	Li_2SO_4
Li 7	92.57	99.8	BQ 265(ar)	710	Li_2SO_4
Li 7	92.57	98.4	CU 379(a)	4,546	Li_2SO_4
Li 7	92.57	99.86	EZ 628(e)	3,563	Li_2SO_4
Li 7	92.57	ca 99.99	GE 767(j)	1,000	Li_2SO_4
Boron					
B 10	19.57	86.78	DP 481(a)	40	H_3BO_3
B 10	19.57	*	FV 734(a)	1,679	H_3BO_3
B 10	19.57	*	GF 768(a)	550	H_3BO_3
B 11	80.43	*	BM 250(a)	10	H_3BO_3
B 11	80.43	*	DP 482(a)	200	H_3BO_3
B 11	80.43	97.77	FV 735(a)	195	H_3BO_3
B 11	80.43	*	GF 769(a)	870	H_3BO_3

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Carbon					
C 12	98.91	99.96	FD 638(ah)	1,140	C
C 12	98.91	99.94	FD 638(aj)	9,950	C
Magnesium					
Mg 24	78.98	99.5	P 47(a)	1,570	M_gO
Mg 24	78.98	98.36	Q 50(a)	192	M_gO
Mg 24	78.98	99.52	BZ 288(a)	24	M_gO
Mg 24	78.98	99.2	BZ 288(b)	132	M_gO
Mg 24	78.98	99.5	BZ 288(c)	2,251	M_gO
Mg 24	78.98	99.4	BZ 288(d)	1,786	M_gO
Mg 24	78.98	99.59	DZ 519(a)	3,274	M_gO
Mg 25	10.03	62.59	Q 51(a)	20	M_gO
Mg 25	10.03	65.67	Q 51(b)	14	M_gO
Mg 25	10.03	86.8	BZ 289(a)	220	M_gO
Mg 25	10.03	92.33	DZ 520(a)	1,270	M_gO
Mg 26	10.99	96.16	P 49(a)	416	M_gO
Mg 26	10.99	95.91	BZ 290(a)	213	M_gO
Mg 26	10.99	98.12	DZ 521(a)	0	M_gO
Silicon					
Si 28	92.17	99.4	AI-AJ 103-106(a)	1,796	SiO_2
Si 28	92.17	98.1	BW 280(a)	7,510	SiO_2

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Silicon (Cont'd)					
Si 28	92.17	99.16	EB 524(a)	9,041	SiO_2
Si 28	92.17	*	GC 761(a)	9,550	SiO_2
Si 29	4.71	68.62	EB 525(a)	90	SiO_2
Si 29	4.71	*	GC 762(a)	870	SiO_2
Si 30	3.12	63.9	AI-AJ 105-108(a)	50	SiO_2
Si 30	3.12	49.6	BW 282(a)	350	SiO_2
Si 30	3.12	64.04	EB 526(a)	48	SiO_2
Si 30	3.12	*	GC 763(a)	690	SiO_2
Sulfur					
S 32	94.89	97.90	CX 391(a)	215	S
S 32	94.89	98.45	ES 596(a)	7,463	CdS
S 32	94.89	*	GB 757(a)	2,200	CdS
S 33	0.80	5.54	CX 392(a)	25	S
S 33	0.80	9.8	ES 597(a)	0	
S 33	0.80	*	GB 758(a)	350	CdS
S 34	4.29	20.65	CX 393(a)	0	
S 34	4.29	5.38	CX 393(b)	59	S
S 34	4.29	14.92	ES 598(a)	997	CdS
S 34	4.29	*	GB 759(a)	1,400	CdS
S 36	0.02	0.08	ES 599(a)	24	CdS
S 36	0.02	*	GB 760(a)	10	CdS

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Chlorine					
Cl 35	75.4	79.5	AV 161(cl)	18	AgCl
Cl 35	75.4	92.4	DH 436(a)	0	
Cl 35	75.4	*	FW 736(a)	16,903	NaCl
C 35	75.4	*	FW 736(b)	8,824	NaCl
Cl 37	24.6	65.6	DH 438(a)	220	AgCl
Cl 37	24.6	*	FW 737(a)	72	NaCl
Cl 37	24.6	*	FW 737(b)	4,777	NaCl
Potassium					
K 39	93.25	99.5	BJ 237(a)	1,592	$KClO_4$
K 39	93.25	99.9	CM 346(a)	110	KCl
K 39	93.25	99.9	CM 346(ar)	9,920	KCl
K 39	93.25	99.94	DA 407(a)	19,225	KCl
K 39	93.25	99.74	DB 410(a)	5,659	KCl
K 39	93.25	99.89	DT 494(a)	9,384	KCl
K 39	93.25	99.96	EX 621(g)	18,470	KCl
K 39	93.25	99.94	EY 624(i)	24,977	KCl
K 39	93.25	99.83	FA 629(a)	10,473	KCl
K 40	0.011	7.75	EY 625(t)	0	
K 41	6.74	92.9	BJ 239(a)	65	$KClO_4$
K 41	6.74	86.8	CM 348(a)	37	KCl
K 41	6.74	98.94	DT 496(a)	450	KCl
K 41	6.74	98.94	DT 496(ar)	65	KCl

* - Analysis Imcomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Potassium (Cont'd)					
K 41	6.74	99.21	EY 626(e)	609	KCl
K 41	6.74	99.21	EY 626(er)	35	KCl
K 41	6.74	87.75	FA 631(a)	239	KCl
Calcium					
Ca 40	96.96	98.6	V 61(b)	114	CaO
Ca 40	96.96	99.97	X 70(a)	1,060	CaO
Ca 40	96.96	98.9	BN 251(a)	5,825	$CaCO_3$
Ca 40	96.96	99.83	DI 441(d)	35,259	$CaCO_3$
Ca 40	96.96	99.98	EV 613 (a)	28,733	$CaCO_3$
Ca 40	96.96	99.98	FF 648(a)	44,756	$CaCO_3$
Ca 40	96.96	*	FO 689(a)	97,500	$CaCO_3$
Ca 42	0.64	28.3	DI 442(b)	393	$CaCO_3$
Ca 42	0.64	82.52	EV 614(a)	140	$CaCO_3$
Ca 42	0.64	64.17	FF 649(a)	355	$CaCO_3$
Ca 42	0.64	**	FO 690(a)		
Ca 43	0.145	37.56	DI 443(b)	43	$CaCO_3$
Ca 43	0.145	72.13	EV 615(a)	0	
Ca 43	0.145	67.95	FO 691(a)	295	$CaCO_3$
Ca 44	2.06	85.4	BN 254(a)	40	$CaCO_3$
Ca 44	2.06	96.2	CS 373(a)	0	
Ca 44	2.06	97.90	EV 616(a)	488	$CaCO_3$

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Calcium (Cont'd)					
Ca 44	2.06	97.99	FF 651(a)	555	$CaCO_3$
Ca 44	2.06	**	FO 692(a)		
Ca 46	0.0033	10.16	FF 652(a)	0	
Ca 48	0.185	84.28	FO 694(a)	0	
Ca 48	0.185	7.49	FF 653(a)	10	$CaCO_3$
Titanium					
Ti 46	7.97	84.26	BF 215(a)	100	TiO_2
Ti 46	7.97	84.26	BF 215(ar)	83	TiO_2
Ti 46	7.97	82.68	EN 576(a)	309	TiO_2
Ti 46	7.97	82.68	EN 576(ar)	490	TiO_2
Ti 46	7.97	**	GA 752(a)		
Ti 47	7.41	82.05	BF 216(a)	85	TiO_2
Ti 47	7.41	63.11	EN 577(a)	444	TiO_2
Ti 47	7.41	**	GA 753(a)		
Ti 48	73.50	99.23	BF 217(a)	50	TiO_2
Ti 48	73.50	98.90	EN 578(a)	14,856	TiO_2
Ti 48	73.50	98.90	EN 578(ar)	3,200	TiO_2
Ti 48	73.50	**	GA 754(a)		
Ti 49	5.64	77.62	BF 218(a)	37	TiO_2
Ti 49	5.64	77.62	BF 218(ar)	45	TiO_2
Ti 49	5.64	**	GA 755(a)		
Ti 50	5.48	84.69	BF 219(a)	0	

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Titanium (Cont'd)					
Ti 50	5.48	81.44	EN 580(a)	28	TiO_2
Ti 50	5.48	**	GA 756(a)		
Vanadium					
V 50	0.28	22.83	FM 683(b)	0	
V 51	99.72	>99.95	FB 633(a)	2,516	V_2O_5
V 51	99.72	>99.98	FM 684(a)	26,265	V_2O_5
Chromium					
Cr 50	4.40	88.3	EU 609(a)	393	Cr_2O_3
Cr 52	83.73	99.14	D 11(a)	510	Cr_2O_3
Cr 52	83.73	99.14	D 11(ar)	140	Cr_2O_3
Cr 52	83.73	99.1	CD 310(a)	3,057	Cr_2O_3
Cr 52	83.73	97.1	EU 610(a)	23,140	Cr_2O_3
Cr 53	9.49	88.59	D 12(a)	56	Cr_2O_3
Cr 53	9.49	92.1	CD 311(a)	14	Cr_2O_3
Cr 53	9.49	90.06	EU 611(a)	6	Cr_2O_3
Cr 54	2.38	83.1	CD 312(a)	145	Cr_2O_3
Cr 54	2.38	88.95	EU 612(a)	0	
Iron					
Fe 54	5.90	55.47	V 3(a)	57	Fe_2O_3

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Iron (Cont'd)					
Fe 54	5.90	39.0	B 3(f)	268	Fe_2O_3
Fe 54	5.90	81.06	E 14(a)	335	Fe_2O_3
Fe 54	5.90	83.03	F 18(a)	32	Fe_2O_3
Fe 54	5.90	49.2	AM 122(a)	343	Fe_2O_3
Fe 54	5.90	93.27	AZ 183(a)	16	Fe_2O_3
Fe 54	5.90	87.9	BA 187(a)	10	Fe_2O_3
Fe 54	5.90	87.9	BA 187(ar)	50	Fe_2O_3
Fe 54	5.90	87.4	BB 194(a)	69	Fe_2O_3
Fe 54	5.90	84.3	CI 328(a)	41	Fe_2O_3
Fe 54	5.90	34.47	DO 477(a)	65,250	Fe_2O_3
Fe 54	5.90	93.06	FC 634(a)	14	Fe_2O_3
Fe 54	5.90	**	FN 685(a)		
Fe 54	5.90	**	FN 685(b)		
Fe 56	91.52	98.41	B 4(a)	4,270	Fe_2O_3
Fe 56	91.52	98.5	B 4(e)	901	Fe_2O_3
Fe 56	91.52	98.62	E 15(a)	10,403	Fe_2O_3
Fe 56	91.52	97.42	F 19(a)	1,120	Fe_2O_3
Fe 56	91.52	98.9	AM 123(a)	2,627	Fe_2O_3
Fe 56	91.52	99.0	AZ 184(a)	12,451	Fe_2O_3
Fe 56	91.52	98.5	BA 188(a)	35,471	Fe_2O_3
Fe 56	91.52	98.3	BB 192(a)	9,818	Fe_2O_3
Fe 56	91.52	96.5	CI 329(a)	51,056	Fe_2O_3
Fe 56	91.52	99.84	CZ 404(f)	8,190	Fe_2O_3

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Iron (Cont'd)					
Fe 56	91.52	99.70	DO 478(a)	242,643	Fe_2O_3
Fe 56	91.52	99.70	DO 478(ar)	76,218	Fe_2O_3
Fe 56	91.52	99.70	DO 478(as)	27,594	Fe
Fe 56	91.52	*	FC 635(a)	18,171	Fe_2O_3
Fe 56	91.52	*	FN 686(a)	304,226	Fe_2O_3
Fe 56	91.52	**	FN 686(b)		
Fe 57	2.24	21.10	B 5(a)	62	Fe_2O_3
Fe 57	2.24	30.5	B 5(f)	81	Fe_2O_3
Fe 57	2.24	69.63	F 20(a)	15	Fe_2O_3
Fe 57	2.24	33.2	AM 124(a)	69	Fe_2O_3
Fe 57	2.24	77.6	BB 193(a)	65	Fe_2O_3
Fe 57	2.24	51.91	CZ 405(f)	509	Fe_2O_3
Fe 57	2.24	79.43	DK 449(a)	232	Fe_2O_3
Fe 57	2.24	62.38	DL 453(a)	830	Fe_2O_3
Fe 57	2.24	59.31	DL 453(d)	381	Fe_2O_3
Fe 57	2.24	31.9	DL 453(e)	1,245	Fe_2O_3
Fe 57	2.24	59.3	DL 453(f)	1,122	Fe_2O_3
Fe 57	2.24	43.45	DL 453(j)	2,571	Fe_2O_3
Fe 57	2.24	74.6	DM 459(a)	172	Fe_2O_3
Fe 57	2.24	40.61	DL 463(a)	1,687	Fe_2O_3
Fe 57	2.24	45.43	DL 463(b)	1,018	Fe_2O_3
Fe 57	2.24	67.3	DL 463(e)	278	Fe_2O_3
Fe 57	2.24	53.53	DL 463(j)	184	Fe_2O_3

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Iron (Cont'd)					
Fe 57	2.24	54.23	DL 463(k)	1,766	Fe_2O_3
Fe 57	2.24	63.1	DL 467(c)	165	Fe_2O_3
Fe 57	2.24	87.29	DN 475(a)	0	
Fe 57	2.24	83.44	FC 636(a)	22	Fe_2O_3
Fe 57	2.24	**	FN 687(a)		
Fe 57	2.24	**	FN 687(b)		
Fe 58	0.34	22.0	C 8(b)	15	Fe_2O_3
Fe 58	0.34	10.3	AM 125(a)	44	Fe_2O_3
Fe 58	0.34	23.4	DL 454(f)	39	Fe_2O_3
Fe 58	0.34	71.7	DL 454(m)	92	Fe_2O_3
Fe 58	0.34	79.8	DL 464(l)	0	
Fe 58	0.34	75.7	DO 480(a)	117	Fe_2O_3
Fe 58	0.34	42.0	DO 480(b)	183	Fe_2O_3
Fe 58	0.34	34.8	DO 480(c)	37	Fe_2O_3
Fe 58	0.34	74.20	FN 688(b)	37	Fe_2O_3
Fe 58	0.34	59.65	FN 688(c)	104	Fe_2O_3
Fe 58	0.34	55.74	FN 688(d)	72	Fe_2O_3
Fe 58	0.34	57.31	FN 688(f)	197	Fe_2O_3
Fe 58	0.34	65.85	FN 688(g)	82	Fe_2O_3
Fe 58	0.34	78.66	FN 688(i)	82	Fe_2O_3
Fe 58	0.34	78.02	FN 688(j)	86	Fe_2O_3

* - Analysis Imcomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Nickel					
Ni 58	67.4	98.51	K 33(a)	12	NiO
Ni 58	67.4	99.3	AS-AT 141-147(a)	34	NiO
Ni 58	67.4	98.36	DF 422(a)	5,484	NiO
Ni 58	67.4	*	FJ 669(a)	36,817	NiO
Ni 60	26.7	94.4	J 28(a)	18	NiO
Ni 60	26.7	94.4	J 28(ar)	190	NiO
Ni 60	26.7	87.10	K 34(a)	680	NiO
Ni 60	26.7	97.7	AS-AT 142-148(a)	0	
Ni 60	26.7	*	FJ 670(a)	13,430	NiO
Ni 61	1.2	34.42	K 35(a)	28	NiO
Ni 61	1.2	80.9	AS-AT 143-149(a)	0	
Ni 61	1.2	*	FJ 671(a)	315	NiO
Ni 62	3.8	67.99	K 36(a)	50	NiO
Ni 62	3.8	94.7	AS-AT 144-150(a)	0	
Ni 62	3.8	*	DF 425(br)	30	Ni
Ni 62	3.8	*	FJ 672(a)	1,462	NiO
Ni 64	0.88	85.10	J 32(a)	10	NiO
Ni 64	0.88	97.4	AS-AT 146-152(a)	0	
Ni 64	0.88	*	FJ 674(a)	0	
Copper					
Cu 63	69.09	97.0	A 1(a)	650	CuO
Cu 63	69.09	97.0	A 1(ar)	960	CuO

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Copper (Cont'd)					
Cu 63	69.09	99.35	J-K 31-37(a)	730	CuO
Cu 63	69.09	98.2	AV 161(cu)	100	CuO
Cu 63	69.09	99.11	DF 426(a)	3,351	CuO
Cu 63	69.09	96.12	DL 455(a)	578	CuO
Cu 63	69.09	99.40	DU 497(a)	5,638	CuO
Cu 63	69.09	*	FJ 673(a)	9,035	CuO
Cu 65	30.91	93.81	A 2(ar)	461	CuO
Cu 65	30.91	90.6	AV 162(cu)	14	CuO
Cu 65	30.91	98.16	DU 498(a)	3,403	CuO
Zinc					
Zn 64	49.18	83.8	AG 97(a)	394	ZnO
Zn 64	49.18	93.12	EK 556(a)	1,965	ZnO
Zn 66	27.76	78.4	AH 100(a)	712	ZnO
Zn 66	27.76	93.79	EK 557(a)	5,200	ZnO
Zn 67	4.05	56.0	BK 242(a)	102	ZnO
Zn 67	4.05	60.46	EK 558(a)	146	ZnO
Zn 68	18.40	95.47	EK 559(a)	3,827	ZnO
Zn 70	0.61	32.9	AH 102(a)	20	ZnO
Zn 70	0.61	32.0	BK 244(a)	39	ZnO
Zn 70	0.61	48.40	EK 560(a)	100	ZnO

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Gallium					
Ga 69	60.00	98.42	EI 554(a)	3,850	Ga_2O_3
Ga 71	40.00	98.08	EI 555(a)	625	Ga_2O_3
Germanium					
Ge 70	20.63	88.1	BD-BE 205-210(a)	29	GeO_2
Ge 70	20.63	91.38	FZ 747(a)	10,210	GeO_2
Ge 72	27.41	89.2	BD-BE 206-211(a)	860	GeO_2
Ge 72	27.41	94.86	FZ 748(a)	15,537	GeO_2
Ge 73	7.84	68.9	BD-BE 207-212(a)	86	GeO_2
Ge 73	7.84	78.04	FZ 749(a)	3,654	GeO_2
Ge 74	36.37	95.2	BD-BE 208-213(a)	1,360	GeO_2
Ge 74	36.37	95.80	FZ 750(a)	17,620	GeO_2
Ge 76	7.75	81.02	FZ 751(a)	4,697	GeO_2
Ge 76	7.75	79.3	BD-BE 209-214(a)	122	GeO_2
Selenium					
Se 74	0.84	6.5	AK 109(a)	10	Se
Se 74	0.84	12.3	CY 397(ar)	255	Se
Se 74	0.84	12.08	DY 513(a)	229	Se
Se 74	0.84	33.06	FG 654(b)	0	
Se 76	9.15	43.5	AN 126(a)	10	Se
Se 76	9.15	41.5	BS 269(a)	600	Se

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Selenium (Cont'd)					
Se 76	9.15	54.8	CY 398(a)	542	Se
Se 76	9.15	54.8	CY 398(ar)	390	Se
Se 76	9.15	57.40	DY 514(a)	174	Se
Se 76	9.15	74.20	FG 655(a)	374	Se
Se 76	9.15	88.51	FG 655(b)	148	Se
Se 77	7.53	50.1	AK 110(a)	99	Se
Se 77	7.53	53.6	BS 270(a)	143	Se
Se 77	7.53	53.6	BS 270(ar)	500	Se
Se 77	7.53	49.4	CY 399(a)	565	Se
Se 77	7.53	58.40	DY 515(a)	302	Se
Se 77	7.53	74.22	FG 656(c)	203	Se
Se 77	7.53	83.16	FG 656(d)	10	Se
Se 77	7.53	86.58	FG 656(e)	10	Se
Se 77	7.53	91.73	FG 656(f)	25	Se
Se 77	7.53	86.00	FG 656(g)	8	Se
Se 78	23.62	79.3	AN 127(a)	68	Se
Se 78	23.62	79.3	AN 127(ar)	104	Se
Se 78	23.62	72.7	BS 271(a)	1,853	Se
Se 78	23.62	81.7	CY 400(a)	707	Se
Se 78	23.62	81.7	CY 400(ar)	1,026	Se
Se 78	23.62	82.56	DY 516(a)	69	Se
Se 78	23.62	90.24	FG 657(b)	376	Se
Se 78	23.62	96.55	FG 657(d)	145	Se

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Selenium (Cont'd)					
Se 80	49.97	86.7	AK 111(a)	281	Se
Se 80	49.97	94.6	BS 272(a)	1,520	Se
Se 80	49.97	94.6	BS 272(ar)	257	Se
Se 80	49.97	91.7	CY 401(a)	1,136	Se
Se 80	49.97	93.76	DY 517(a)	41	Se
Se 80	49.97	96.94	FG 658(a)	454	Se
Se 80	49.97	98.39	FG 658(b)	851	Se
Se 82	8.89	49.6	AN 128(a)	96	Se
Se 82	8.89	44.4	BS 273(ar)	1,087	Se
Se 82	8.89	51.6	CY 402(a)	314	Se
Se 82	8.89	51.6	CY 402(ar)	260	Se
Se 82	8.89	52.36	DY 518(a)	1,081	Se
Se 82	8.89	75.74	FG 659(a)	460	Se
Se 82	8.89	89.87	FG 659(b)	109	Se
Bromine					
Br 79	50.57	86.96	EJ 552(a)	190	AgBr
Br 81	49.43	96.81	EJ 553(a)	217	AgBr
Rubidium					
Rb 85	72.27	95.97	EW 619(a)	257	RbCl
Rb 87	27.73	89.62	EW 620(a)	680	RbCl

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Strontium					
Sr 84	0.56	63.68	EH 548(a)	0	
Sr 84	0.56	45.95	FL 679(a)	80	$SrCO_3$
Sr 86	9.86	69.9	Z 78(a)	60	SrO
Sr 86	9.86	69.9	Z 78(ar)	470	SrO
Sr 86	9.86	89.02	EH 549(a)	23	$Sr(NO_3)_2$
Sr 86	9.86	83.44	FL 680(a)	1,380	$SrCO_3$
Sr 87	7.02	60.03	EH 550(a)	0	
Sr 87	7.02	42.82	FL 681(a)	1,460	$SrCO_3$
Sr 88	82.6	98.9	Z 79(a)	1,049	SrO
Sr 88	82.6	99.5	BL 248(a)	322	$SrSO_4$
Sr 88	82.6	99.67	EH 551(a)	39	$Sr(NO_3)_2$
Sr 88	82.6	99.63	FL 682(a)	13,480	$SrCO_3$
Zirconium					
Zr 90	50.83	91.7	AA 80(a)	18	ZrO_2
Zr 90	50.83	91.7	AA 80(ar)	460	ZrO_2
Zr 90	50.83	98.0	CK 334(a)	7,045	ZrO_2
Zr 90	50.83	98.0	CK 334(ar)	1,878	ZrO_2
Zr 90	50.83	95.6	CV 381(a)	3,612	ZrO_2
Zr 90	50.83	98.66	EE 539(a)	9,800	ZrO_2
Zr 91	11.21	54.4	AA 81(a)	50	ZrO_2
Zr 91	11.21	54.4	AA 81(ar)	100	ZrO_2

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Zirconium (Cont'd)					
Zr 91	11.21	86.6	CK 335(a)	33	ZrO_2
Zr 91	11.21	86.6	CK 335(ar)	1,235	ZrO_2
Zr 91	11.21	75.1	CV 382(a)	839	ZrO_2
Zr 92	17.18	92.7	CK 336(a)	281	ZrO_2
Zr 92	17.18	92.7	CK 336(ar)	2,149	ZrO_2
Zr 92	17.18	89.8	CV 383(a)	96	ZrO_2
Zr 92	17.18	95.38	EE 541(a)	5,461	ZrO_2
Zr 94	17.79	82.1	AA 83(a)	94	ZrO_2
Zr 94	17.79	82.1	AA 83(ar)	40	ZrO_2
Zr 94	17.79	92.8	CK 337(a)	68	ZrO_2
Zr 94	17.79	92.8	CK 337(ar)	1,786	ZrO_2
Zr 94	17.79	80.9	CV 384(a)	861	ZrO_2
Zr 94	17.79	80.9	CV 384(ar)	188	ZrO_2
Zr 94	17.79	97.92	EE 542(a)	5,068	ZrO_2
Zr 96	2.99	74.6	CK 338(a)	0	
Zr 96	2.99	89.48	EE 543(a)	0	
Molybdenum					
Mo 92	15.04	92.07	R-T 53(a)	48	MoO_3
Mo 92	15.04	95.5	AW 163(ar)	20	MoO_3
Mo 92	15.04	87.57	FP 695(a)	144	MoO_3
Mo 94	9.35	79.1	AW 164(a)	111	MoO_3

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Molybdenum (Cont'd)					
Mo 94	9.35	84.91	FP 696(a)	136	MoO_3
Mo 95	15.78	80.75	R-T 55(a)	804	MoO_3
Mo 95	15.78	88.0	AW 165(a)	121	MoO_3
Mo 95	15.78	86.70	FP 697(a)	164	MoO_3
Mo 95	15.78	91.27	FP 697(b)	105	MoO_3
Mo 96	16.56	85.94	R-T 56(a)	2,797	MoO_3
Mo 96	16.56	90.6	AW 166(a)	81	MoO_3
Mo 96	16.56	92.0	FP 698(a)	110	MoO_3
Mo 97	9.60	77.97	R-T 57(a)	474	MoO_3
Mo 97	9.60	77.97	R-T 57(ar)	374	MoO_3
Mo 97	9.60	75.4	AW 167(a)	510	MoO_3
Mo 97	9.60	73.45	FP 699(a)	82	MoO_3
Mo 97	9.60	89.63	FP 699(b)	119	MoO_3
Mo 98	24.00	95.0	R-T 58(a)	486	MoO_3
Mo 98	24.00	89.9	R-T 58(b)	393	MoO_3
Mo 98	24.00	96.3	AW 168(a)	287	MoO_3
Mo 98	24.00	95.15	FP 700(a)	545	MoO_3
Mo 100	9.67	90.20	R-T 59(b)	40	MoO_3
Mo 100	9.67	93.0	AW 169(a)	25	MoO_3
Mo 100	9.67	86.65	FP 701(a)	25	MoO_3
Palladium					
Pd 102	0.8	*	GG 770(a)	280	Pd

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Palladium (Cont'd)					
Pd 104	9.3	*	GG 771(a)	1,790	Pd
Pd 105	22.6	78.19	GG 772(a)	520	Pd
Pd 106	27.1	*	GG 773(a)	2,925	Pd
Pd 108	26.7	94.19	GG 774(a)	3,995	Pd
Pd 110	13.5	*	GG 775(a)	1,700	Pd
Silver					
Ag 107	51.86	98.96	N 41(a)	39	AgCl
Ag 107	51.86	90.26	S-U 41(b)	115	AgCl
Ag 107	51.86	90.26	S-U 41(br)	2,143	Ag
Ag 107	51.86	96.10	EA 522(a)	1,030	AgCl
Ag 109	48.14	95.88	N 42(a)	31	AgCl
Ag 109	48.14	92.16	S-U 42(b)	22	AgCl
Ag 109	48.14	92.16	S-U 42(br)	1,644	Ag
Ag 109	48.14	99.54	EA 523(a)	1,135	AgCl
Cadmium					
Cd 106	1.22	19.94	AC 88(a)	44	CdO
Cd 106	1.22	32.9	CE 314(a)	80	CdO
Cd 108	0.89	14.2	AX 170(a)	98	CdO
Cd 108	0.89	24.8	CE 315(a)	0	
Cd 110	12.43	55.8	AX 171(a)	2,027	CdO

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Cadmium (Cont'd)					
Cd 110	12.43	70.0	CE 316(a)	1,766	CdO
Cd 111	12.86	53.3	AC 89(a)	295	CdO
Cd 111	12.86	64.5	CE 317(a)	3,045	CdO
Cd 112	23.79	79.3	AX 172(a)	1,890	CdO
Cd 112	23.79	83.5	CE 318(a)	3,425	CdO
Cd 113	12.34	25.5	AB 86(a)	376	CdO
Cd 113	12.34	54.1	CE 319(a)	1,818	CdO
Cd 114	28.81	79.52	AC 90(a)	772	CdO
Cd 114	28.81	94.2	CE 320(a)	2,945	CdO
Cd 114	28.81	94.2	CE 320(ar)	316	CdO
Cd 116	7.66	71.2	CE 321(a)	115	CdO
Cd 116	7.66	71.2	CE 321(ar)	10	CdO
Indium					
In 113	4.22	22.8	BH 225(a)	83	In_2O_3
In 113	4.22	16.8	CO 354(a)	290	In_2O_3
In 113	4.22	65.4	CQ 358(a)	0	
In 113	4.22	14.2	DE 419(a)	734	In_2O_3
In 113	4.22	59.58	ER 594(a)	316	In_2O_3
In 115	95.78	99.56	AD 92(a)	964	In_2O_3
In 115	95.78	99.6	BH 226(a)	856	In_2O_3
In 115	95.78	99.6	BH 226(ar)	470	In_2O_3

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Indium (Cont'd)					
In 115	95.78	99.9	CO 355(a)	14,563	In_2O_3
In 115	95.78	99.94	ER 595(a)	30,900	In_2O_3
In 115	95.78	99.94	ER 595(ar)	11,000	In_2O_3
Tin					
Sn 112	1.00	72.49	EC 527(a)	0	
Sn 112	1.00	58.88	FS 710(a)	187	SnO_2
Sn 114	0.68	50.03	EC 528(a)	138	SnO_2
Sn 114	0.68	45.10	FS 711(a)	82	SnO_2
Sn 115	0.44	4.5	BI 229(a)	28	SnO_2
Sn 115	0.44	14.0	EC 529(a)	535	SnO_2
Sn 115	0.44	17.64	FS 712(a)	0	
Sn 115	0.44	*	FS 712(b)	90	SnO_2
Sn 116	14.40	74.5	AY 176(a)	116	SnO_2
Sn 116	14.40	74.5	AY 176(as)	49	Sn
Sn 116	14.40	58.4	BC 198(a)	388	SnO_2
Sn 116	14.40	43.2	BI 230(a)	304	SnO_2
Sn 116	14.40	89.57	CR 363(a)	4,144	SnO_2
Sn 116	14.40	92.64	EC 530(a)	6,260	SnO_2
Sn 116	14.40	90.89	FS 713(a)	4,425	SnO_2
Sn 116	14.40	*	FS 713(b)	2,913	SnO_2
Sn 117	7.68	75.3	BI 231(b)	288	SnO_2
Sn 117	7.68	75.3	BI 231(bs)	182	Sn

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Tin (Cont'd)					
Sn 117	7.68	73.93	CR 364(a)	4,748	SnO_2
Sn 117	7.68	77.07	EC 531(a)	1,981	SnO_2
Sn 117	7.68	61.83	FS 714(a)	2,607	SnO_2
Sn 117	7.68	*	FS 714(b)	1,437	SnO_2
Sn 118	24.07	69.3	AL 117(a)	918	SnO_2
Sn 118	24.07	90.1	AY 178(a)	1,014	SnO_2
Sn 118	24.07	90.1	AY 178(as)	346	Sn
Sn 118	24.07	91.8	BC 200(a)	63	SnO_2
Sn 118	24.07	84.6	BI 232(a)	1,020	SnO_2
Sn 118	24.07	93.26	CR 365(a)	8,510	SnO_2
Sn 118	24.07	94.91	EC 532(a)	13,126	SnO_2
Sn 118	24.07	95.86	FS 715(a)	11,804	SnO_2
Sn 118	24.07	*	FS 715(b)	4,970	SnO_2
Sn 119	8.63	77.1	AY 179(a)	93	SnO_2
Sn 119	8.63	77.1	AY 179(as)	48	Sn
Sn 119	8.63	64.4	BC 201(a)	382	SnO_2
Sn 119	8.63	78.5	BI 233(a)	166	SnO_2
Sn 119	8.63	78.25	CR 366(a)	5,024	SnO_2
Sn 119	8.63	79.82	EC 533(a)	16,556	SnO_2
Sn 119	8.63	*	FS 716(a)	4,400	SnO_2
Sn 119	8.63	*	FS 716(b)	1,730	SnO_2
Sn 120	32.53	93.5	AL 119(a)	420	SnO_2
Sn 120	32.53	95.4	AY 180(a)	1,588	SnO_2

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Tin (Cont'd)					
Sn 120	32.53	95.4	AY 180(as)	464	Sn
Sn 120	32.53	72.6	BC 202(a)	3,155	SnO_2
Sn 120	32.53	53.6	BI 234(a)	1,760	SnO_2
Sn 120	32.53	97.01	CR 367(a)	18,120	SnO_2
Sn 120	32.53	98.14	EC 534(a)	17,976	SnO_2
Sn 120	32.53	98.21	FS 717(a)	16,592	SnO_2
Sn 120	32.53	*	FS 717(b)	6,177	SnO_2
Sn 122	4.68	45.8	BI 235(a)	13	SnO_2
Sn 122	4.68	83.66	CR 368(a)	2,545	SnO_2
Sn 122	4.68	88.92	EC 535(a)	1,984	SnO_2
Sn 122	4.68	88.92	EC 535(au)	241	Sn
Sn 122	4.68	84.62	FS 718(a)	497	SnO_2
Sn 122	4.68	*	FS 718(b)	955	SnO_2
Sn 124	5.89	71.0	BI 236(ar)	125	SnO_2
Sn 124	5.89	83.1	CR 369(au)	49	Sn
Sn 124	5.89	95.04	EC 536(a)	10	SnO_2
Sn 124	5.89	95.04	EC 536(as)	1,350	Sn
Sn 124	5.89	90.26	FS 719(a)	526	SnO_2
Sn 124	5.89	*	FS 719(b)	900	SnO_2
Antimony					
Sb 121	57.25	99.4	AE 93(a)	0	
Sb 121	57.25	99.4	AE 93(ar)	244	Sb

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Antimony (Cont'd)					
Sb 121	57.25	97.7	BT 274(a)	50	Sb
Sb 123	42.75	96.7	AE 94(a)	0	
Sb 123	42.75	96.7	AE 94(ar)	372	Sb
Sb 123	42.75	95.6	BT 275(a)	377	Sb
Tellurium					
Te 120	0.094	22.3	DX 505(a)	0	
Te 120	0.094	19.90	FE 640(a)	0	
Te 122	2.46	77.8	AU 154(a)	19	Te
Te 122	2.46	86.24	DX 506(a)	50	Te
Te 122	2.46	81.72	FE 641(a)	93	Te
Te 123	0.86	34.9	AU 155(a)	7	Te
Te 123	0.86	60.91	DX 507(a)	67	Te
Te 123	0.86	48.58	FE 642(a)	114	Te
Te 124	4.67	72.5	AU 156(a)	56	Te
Te 124	4.67	83.9	CA 295(a)	22	Te
Te 124	4.67	21.8	CA 295(b)	0	
Te 124	4.67	76.47	DX 508(a)	555	Te
Te 124	4.67	81.34	FE 643(a)	548	Te
Te 125	6.97	81.1	AU 157(a)	38	Te
Te 125	6.97	87.9	CA 296(ar)	2,130	Te
Te 125	6.97	40.5	CA 296(b)	264	Te
Te 125	6.97	81.65	DX 509(a)	200	Te

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Tellurium (Cont'd)					
Te 125	6.97	80.53	FE 644(a)	1,262	Te
Te 126	18.69	93.2	AU 158(a)	1,496	Te
Te 126	18.69	95.4	CA 297(a)	1,547	Te
Te 126	18.69	95.4	CA 297(ar)	943	Te
Te 126	18.69	79.0	CA 297(b)	914	Te
Te 126	18.69	89.68	DX 510(b)	4,411	Te
Te 126	18.69	93.46	FE 645(a)	3,261	Te
Te 128	31.81	93.5	AU 159(a)	1,156	Te
Te 128	31.81	94.4	CA 298(a)	8,795	Te
Te 128	31.81	94.4	CA 298(ar)	714	Te
Te 128	31.81	91.8	CA 298(b)	1,594	Te
Te 128	31.81	94.0	CA 298(c)	111	Te
Te 128	31.81	82.32	DX 511(a)	5,760	Te
Te 128	31.81	96.47	FE 646(a)	4,881	Te
Te 130	34.44	93.0	AU 160(a)	630	Te
Te 130	34.44	97.4	CA 299(a)	7,605	Te
Te 130	34.44	93.5	CA 299(br)	950	Te
Te 130	34.44	78.23	DX 512(a)	4,734	Te
Te 130	34.44	97.78	FE 647(a)	4,412	Te
Barium					
Ba 130	0.103	27.50	FT 720(a)	10	$BaCO_3$
Ba 130	0.103	23.31	FU 727(a)	75	$BaCO_3$

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Barium (Cont'd)					
Ba 132	0.096	6.69	FT 721(a)	792	$BaCO_3$
Ba 132	0.096	12.01	FU 728(a)	275	$BaCO_3$
Ba 134	2.39	15.41	FT 722(a)	4,995	$BaCO_3$
Ba 134	2.39	50.82	FU 729(a)	1,969	$BaCO_3$
Ba 135	6.55	67.32	DG 432(a)	350	$BaCO_3$
Ba 135	6.55	58.22	FU 730(a)	5,314	$BaCO_3$
Ba 136	7.79	39.22	FT 724(a)	5,200	$BaCO_3$
Ba 136	7.79	48.72	FU 731(a)	7,752	$BaCO_3$
Ba 137	11.25	39.98	DG 434(a)	1,116	$BaCO_3$
Ba 137	11.25	43.56	FU 732(a)	9,660	$BaCO_3$
Ba 138	71.83	98.04	DG 435(a)	380	$BaCO_3$
Ba 138	71.83	96.73	FT 726(a)	37,220	$BaCO_3$
Ba 138	71.83	97.41	FU 733(a)	34,830	$BaCO_3$
Lanthanum					
La 138	0.087	0.597	EF 544(a)	349	La_2O_3
La 139	99.913	99.96	EF 545(a)	8,640	La_2O_3
Cerium					
Ce 136	0.195	29.97	FR 706(a)	198	CeO_2
Ce 138	0.265	4.42	DW 502(a)	415	CeO_2
Ce 138	0.265	10.22	FK 676(a)	195	CeO_2

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Cerium (Cont'd)					
Ce 138	0.265	13.10	FR 707(a)	580	CeO_2
Ce 140	88.44	98.5	CW 389(a)	3,786	CeO_2
Ce 140	88.44	98.7	DD 417(a)	8,397	CeO_2
Ce 140	88.44	98.7	DD 417(ar)	4,350	CeO_2
Ce 140	88.44	99.25	DW 503(ar)	8,450	CeO_2
Ce 140	88.44	99.55	FK 677(a)	6,263	CeO_2
Ce 140	88.44	99.65	FR 708(a)	22,478	CeO_2
Ce 142	11.10	87.4	DD 418(b)	29	CeO_2
Ce 142	11.10	87.4	DD 418(br)	800	CeO_2
Ce 142	11.10	84.42	DW 504(a)	1,330	CeO_2
Ce 142	11.10	88.84	FK 678(a)	826	CeO_2
Ce 142	11.10	90.08	FR 709(a)	5,863	CeO_2
Neodymium					
Nd 142	26.83	93.00	EQ 587(a)	20	Nd_2O_3
Nd 142	26.83	93.00	EQ 587(ar)	1,830	Nd_2O_3
Nd 142	26.83	*	FX 738(a)	498	Nd_2O_3
Nd 142	26.83	*	FX 738(b)	1,280	Nd_2O_3
Nd 142	26.83	*	GI 783(a)	24,250	Nd_2O_3
Nd 143	12.10	83.93	EQ 588(a)	102	Nd_2O_3
Nd 143	12.10	*	FX 739(a)	290	Nd_2O_3
Nd 143	12.10	*	FX 739(b)	478	Nd_2O_3
Nd 143	12.10	*	GI 784(a)	10,750	Nd_2O_3

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Neodymium (Cont'd)					
Nd 144	23.95	93.45	EQ 589(a)	91	Nd_2O_3
Nd 144	23.95	93.45	EQ 589(ar)	1,850	Nd_2O_3
Nd 144	23.95	*	FX 740(a)	348	Nd_2O_3
Nd 144	23.95	*	FX 740(b)	413	Nd_2O_3
Nd 144	23.95	**	GI 785(a)		
Nd 145	8.36	78.60	EQ 590(a)	187	Nd_2O_3
Nd 145	8.36	78.60	EQ 590(ar)	87	Nd_2O_3
Nd 145	8.36	*	FX 741(a)	432	Nd_2O_3
Nd 145	8.36	**	GI 786(a)		
Nd 146	17.29	95.60	EQ 591(a)	21	Nd_2O_3
Nd 146	17.29	95.60	EQ 591(ar)	1,000	Nd_2O_3
Nd 146	17.29	*	FX 742(a)	440	Nd_2O_3
Nd 146	17.29	**	GI 787(a)		
Nd 148	5.80	89.85	EQ 592(ar)	69	Nd_2O_3
Nd 148	5.80	*	FX 743(a)	70	Nd_2O_3
Nd 148	5.80	*	FX 743(b)	30	Nd_2O_3
Nd 148	5.80	*	GI 788(a)	3,080	Nd_2O_3
Nd 150	5.67	94.76	EQ 593(ar)	155	Nd_2O_3
Nd 150	5.67	*	FX 744(a)	70	Nd_2O_3
Nd 150	5.67	*	GI 789(a)	2,050	Nd_2O_3
Samarium					
Sm 144	3.13	72.13	EM 567(a)	0	

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Samarium (Cont'd)					
Sm 144	3.13	58.93	FH 660(a)	14	Sm_2O_3
Sm 144	3.13	**	GM 813(a)		
Sm 147	15.12	78.35	FH 661(a)	345	Sm_2O_3
Sm 147	15.12	81.63	EM 569(a)	14	Sm_2O_3
Sm 147	15.12	**	GM 814(a)		
Sm 148	11.29	76.01	EM 570(a)	178	Sm_2O_3
Sm 148	11.29	62.40	FH 662(a)	649	Sm_2O_3
Sm 148	11.29	**	GM 815(a)		
Sm 149	13.87	71.53	EM 571(a)	34	Sm_2O_3
Sm 149	13.87	73.01	FH 663(a)	423	Sm_2O_3
Sm 149	13.87	**	GM 816(a)		
Sm 150	7.38	74.09	EM 572(a)	48	Sm_2O_3
Sm 150	7.38	68.04	FH 664(a)	907	Sm_2O_3
Sm 150	7.38	**	GM 817(a)		
Sm 152	26.59	89.90	EM 573(a)	2,386	Sm_2O_3
Sm 152	26.59	93.92	FH 665(a)	138	Sm_2O_3
Sm 152	26.59	93.92	FH 665(ar)	4,700	Sm_2O_3
Sm 152	26.59	**	GM 818(a)		
Sm 154	22.62	92.10	EM 574(a)	2,528	Sm_2O_3
Sm 154	22.62	96.05	FH 666(a)	230	Sm_2O_3
Sm 154	22.62	96.05	FH 666(ar)	2,150	Sm_2O_3
Sm 154	22.62	**	GM 819(a)		
Sm 154	22.62	**	GM 819(b)		

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Gadolinium					
Gd 152	0.20	**	GK 798(a)		
Gd 154	2.15	**	GK 799(a)		
Gd 155	14.73	**	GK 800(a)		
Gd 156	20.47	**	GK 801(a)	11,450	Ga_2O_3
Gd 157	15.68	**	GK 802(a)		
Gd 158	24.87	**	GK 803(a)		
Gd 160	21.90	**	GK 804(a)		
Hafnium					
Hf 174	0.17	7.85	ET 602(a)	0	
Hf 176	5.22	48.46	ET 603(a)	0	
Hf 177	18.53	61.71	ET 604(a)	0	
Hf 178	27.25	80.91	ET 605(a)	0	
Hf 179	13.67	46.57	ET 606(a)	0	
Hf 180	35.16	93.96	ET 607(a)	0	
Tungsten					
W 180	0.16	9.00	BG 220(a)	0	
W 180	0.16	4.95	CL 340(a)	41	WO_3
W 180	0.16	4.95	CL 340(ar)	54	WO_3
W 180	0.16	6.95	EL 561(a)	194	WO_3
W 182	26.21	94.25	BG 221(a)	46	WO_3

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Tungsten (Cont'd)					
W 182	26.21	91.58	CL 341(a)	1,639	WO_3
W 182	26.21	92.33	EL 562(a)	10,990	WO_3
W 183	14.33	86.21	BG 222(a)	217	WO_3
W 183	14.33	82.01	CL 342(a)	745	WO_3
W 183	14.33	82.63	EL 563(a)	5,664	WO_3
W 184	30.61	95.72	BG 223(a)	390	WO_3
W 184	30.61	91.14	CL 343(a)	106	WO_3
W 184	30.61	91.14	CL 343(ar)	2,579	WO_3
W 184	30.61	95.06	EL 564(a)	10,974	WO_3
W 186	28.69	97.94	BG 224(a)	92	WO_3
W 186	28.69	97.17	CL 344(a)	810	WO_3
W 186	28.69	97.17	CL 344(ar)	372	WO_3
W 186	28.69	97.54	EL 565(a)	10,367	WO_3
Rhenium					
Re 185	37.31	85.38	CP 356(a)	2,241	Re
Re 187	62.69	98.22	CP 357(a)	245	Re
Iridium					
Ir 191	38.5	**	GL 810(a)		
Ir 193	61.5	**	GL 811(a)		

* - Analysis Imcomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Platinum					
Pt 190	0.012	*	GH 776(a)	270	Pt
Pt 192	0.78	*	GH 777(a)	215	Pt
Pt 192	0.78	*	GH 777(b)	875	Pt
Pt 194	32.8	*	GH 778(a)	11,945	Pt
Pt 195	33.7	*	GH 779(a)	3,185	Pt
Pt 196	25.4	*	GH 780(a)	6,960	Pt
Pt 198	7.23	*	GH 781(a)	465	Pt
Pt 198	7.23	*	GH 781(b)	1,010	Pt
Mercury					***
Hg 196	0.16	8.44	DR 485(a)	0	
Hg 196	0.16	1.46	DR 485(c)	297	$Hg(NO_3)_2$
Hg 198	10.02	79.11	DR 486(a)	27	$Hg(NO_3)_2$
Hg 198	10.02	66.11	DR 486(b)	375	$Hg(NO_3)_2$
Hg 198	10.02	53.37	DR 486(c)	853	$Hg(NO_3)_2$
Hg 198	10.02	54.35	DR 486(d)	2,930	$Hg(NO_3)_2$
Hg 199	16.90	73.09	DR 487(a)	0	
Hg 199	16.90	73.09	DR 487(as)	51	Hg
Hg 199	16.90	72.1	DR 487(b)	28	$Hg(NO_3)_2$
Hg 199	16.90	65.45	DR 487(d)	43	$Hg(NO_3)_2$
Hg 199	16.90	65.45	DR 487(ds)	507	Hg
Hg 200	23.10	91.39	DR 488(a)	44	$Hg(NO_3)_2$
Hg 200	23.10	86.45	DR 488(b)	75	$Hg(NO_3)_2$

* - Analysis Incomplete
** - Refinement Incomplete
*** - $Hg(NO_3)_2$ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Mercury (Cont'd)					***
Hg 200	23.10	86.45	DR 488(bs)	505	Hg
Hg 200	23.10	80.85	DR 488(c)	749	$Hg(NO_3)_2$
Hg 200	23.10	74.90	DR 488(d)	3,478	$Hg(NO_3)_2$
Hg 200	23.10	64.66	DR 488(e)	1,420	$Hg(NO_3)_2$
Hg 200	23.10	76.28	DR 488(f)	489	$Hg(NO_3)_2$
Hg 201	13.20	71.8	DR 489(a)	26	$Hg(NO_3)_2$
Hg 201	13.20	71.8	DR 489(as)	80	Hg
Hg 201	13.20	62.48	DR 489(b)	38	$Hg(NO_3)_2$
Hg 201	13.20	62.48	DR 489(bs)	206	Hg
Hg 202	29.76	98.3	DR 490(a)	36	$Hg(NO_3)_2$
Hg 202	29.76	98.06	DR 490(b)	20	$Hg(NO_3)_2$
Hg 202	29.76	96.45	DR 490(d)	122	$Hg(NO_3)_2$
Hg 202	29.76	96.45	DR 490(ds)	105	Hg
Hg 202	29.76	95.13	DR 490(e)	329	$Hg(NO_3)_2$
Hg 202	29.76	91.46	DR 490(f)	25	$Hg(NO_3)_2$
Hg 202	29.76	91.46	DR 490(fs)	120	Hg
Hg 202	29.76	87.87	DR 490(g)	354	$Hg(NO_3)_2$
Hg 202	29.76	80.27	DR 490(h)	4,334	$Hg(NO_3)_2$
Hg 202	29.76	75.75	DR 490(i)	825	$Hg(NO_3)_2$
Hg 204	6.86	89.17	DR 491(a)	0	
Hg 204	6.86	77.61	DR 491(b)	138	$Hg(NO_3)_2$
Hg 204	6.86	69.80	DR 491(as)	280	Hg
Hg 204	6.86	62.78	DR 491(d)	129	$Hg(NO_3)_2$

* - Analysis Incomplete
** - Refinement Incomplete
*** - $Hg(NO_3)_2$ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Mercury (Cont'd)					***
Hg 204	6.86	49.66	DR 491(e)	344	$Hg(NO_3)_2$
Hg 204	6.86	49.66	DR 491(es)	147	Hg
Hg 204	6.86	42.91	DR 491(f)	662	$Hg(NO_3)_2$
Hg 204	6.86	30.07	DR 491(g)	363	$Hg(NO_3)_2$
Hg 204	6.86	72.34	DR 491(h)	93	$Hg(NO_3)_2$
Hg 204	6.86	72.34	DR 491(hs)	143	Hg
Thallium					
Tl 203	29.51	75.6	BV-3 278(a)	119	Tl_2O_3
Tl 203	29.51	47.9	BY-3 286(a)	320	Tl_2O_3
Tl 203	29.51	58.8	CC-3 307(a)	404	Tl_2O_3
Tl 203	29.51	86.0	CF-3 322(a)	416	Tl_2O_3
Tl 203	29.51	34.1	CG-3 324(a)	83	Tl_2O_3
Tl 205	70.49	89.5	BR-3 267(a)	1,261	Tl_2O_3
Tl 205	70.49	95.2	BV-3 279(a)	919	Tl_2O_3
Tl 205	70.49	98.7	BX 285(a)	229	Tl_2O_3
Tl 205	70.49	86.1	CG-3 308(a)	444	Tl_2O_3
Tl 205	70.49	95.6	CF-3 323(a)	107	Tl_2O_3
Tl 205	70.49	91.8	CH-3 327(a)	1,615	Tl_2O_3
Tl 205	70.49	90.5	CJ-3 333(a)	1,715	Tl_2O_3

* - Analysis Incomplete
** - Refinement Incomplete
*** - $Hg(NO_3)_2$ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Lead					
Pb 204	1.37	7.8	O 43(a)	87	$PbCrO_4$
Pb 204	1.37	16.69	AQ 135(ar)	38	$PbCrO_4$
Pb 204	1.37	23.4	BO 257(a)	13	$PbCrO_4$
Pb 204	1.37	27.0	CN 349(ar)	355	PbO
Pb 204	1.37	25.70	EO 581(a)	1,170	PbO
Pb 204	1.37	5.30	FQ 702(a)	3,170	PbO
Pb 206	26.26	75.67	O 44(a)	278	$PbCrO_4$
Pb 206	26.26	77.9	AQ 136(a)	255	$PbCrO_4$
Pb 206	26.26	71.3	BO 258(a)	238	$PbCrO_4$
Pb 206	26.26	71.3	BO 258(ar)	1,018	$PbCrO_4$
Pb 206	26.26	81.0	CN 350(a)	0	
Pb 206	26.26	64.93	EO 582(a)	3,156	PbO
Pb 206	26.26	35.02	FQ 703(a)	8,726	PbO
Pb 207	20.82	61.55	O 45(a)	181	$PbCrO_4$
Pb 207	20.82	48.2	AQ 137(a)	553	$PbCrO_4$
Pb 207	20.82	48.2	AQ 137(ar)	512	$PbCrO_4$
Pb 207	20.82	66.8	BO 259(a)	1,300	$PbCrO_4$
Pb 207	20.82	66.8	BO 259(ar)	529	$PbCrO_4$
Pb 207	20.82	61.06	EO 583(a)	4,609	PbO
Pb 207	20.82	26.81	FQ 704(a)	8,802	PbO
Pb 208	51.51	92.1	O 46(a)	33	$PbCrO_4$
Pb 208	51.51	92.1	O 46(ar)	160	$PbCrO_4$
Pb 208	51.51	82.10	AQ 138(a)	846	$PbCrO_4$

* - Analysis Incomplete
** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent) Natural	Enriched	Lot	AVAILABLE FOR SHIPMENT Element Weight (milligrams)	Product Form
Lead (Cont'd)					
Pb 208	51.51	96.6	BO 260(a)	160	PbO
Pb 208	51.51	95.8	CN 352(ar)	166	$PbSO_4$
Pb 208	51.51	87.97	EO 584(a)	4,345	PbO
Pb 208	51.51	75.41	FQ 705(a)	9,090	PbO

* - Analysis Imcomplete
** - Refinement Incomplete